NEWKEY/80 Installation & User Guide v1.8
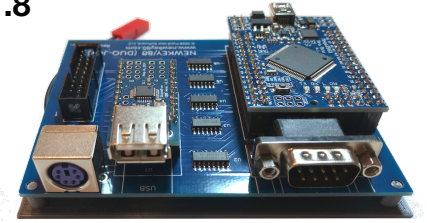TRS-80 Keyboard Adapter
05/22/2019

Plaid Vest Software, LLC.
www.newkey80.com

⚠️ IMPORTANT NOTE:

MAKE SURE TO TURN OFF YOUR TRS-80 BEFORE ATTACHING NEWKEY/80 KEYBOARD RIBBON CABLE AND POWER CABLE.

You can easily damage NEWKEY/80 or your TRS-80 if you attach or remove the keyboard ribbon cable or power connections while the computer is on.

The use of an anti-static wrist strap is recommended when working with your TRS-80 and the NEWKEY/80 adapter.

THE TRS-80 MONITOR CONTAINS EXTREMELY HIGH VOLTAGE EVEN WHEN THE POWER IS OFF. NEVER TOUCH OR MODIFY THE MONITOR OR ATTACHED CIRCUIT BOARD.

Plaid Vest Software, LLC is not responsible or liable for any damage caused by NEWKEY/80. If you are not comfortable performing the installation and/or power connections please return your adapter for a full refund (less shipping charges).

Contents:
- NEWKEY/80 Adapter and protective bottom case
- Keyboard stickers (@, Clear, Break)
- Molex 4-pin Y-Cable (Attaches to disk drive to provide +5v/ground)
- Plain 2-pin Power Cable (for diskless TRS-80 installation)
- 4 Cable Splice Connectors (2 are extra)
- Deluxe 20 pin ribbon cable
- Printed User Manual

🔧 Opening Your TRS-80

YouTube has several good videos on how to open your TRS-80. Make sure to be ***very*** careful when pulling up the cover to avoid breaking the CRT neck. You can look through the top vents to watch the neck clearance as you gently lift the top. Be sure to lift **STRAIGHT UP**.

See video "TRS-80 checks before powering up" on YouTube for a very good procedure for opening your TRS-80: https://www.youtube.com/watch?v=76bVeQP8m3Y

A summary of the process is below.
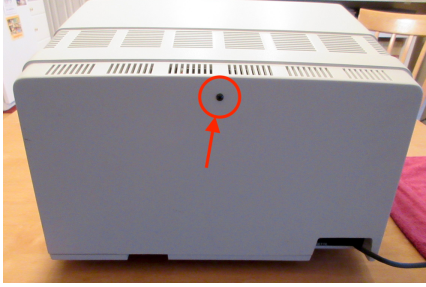
Step 1: Remove back screw
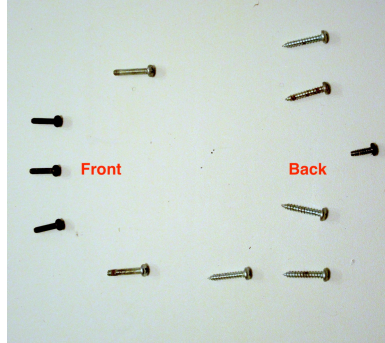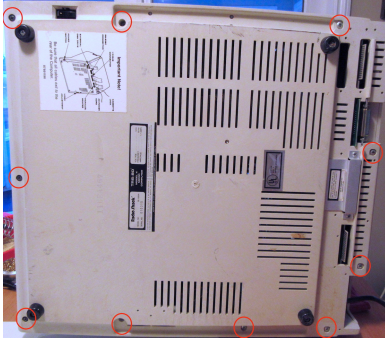
Step 2: Remove 10 bottom screws. Note that the screws <u>are</u> different so keep track of the location of each screw.

Front   Back

Step 3: Carefully lift the case **STRAIGHT UP**. There is a fragile neck on the back of the monitor tube that can be easily damaged. Lifting the case straight up will prevent damage. You can look into the top of the vents above the rear of the monitor tube to see the neck and watch it for clearance as you lift.

Once the monitor tube neck has cleared the top of the motherboard enclosure you can rotate the case on it's side. See picture below.
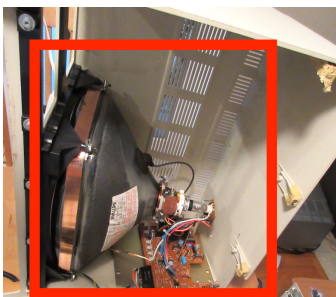
NOTE: Avoid making contact with the monitor tube and related circuit board as they contain very **High Voltage**.

Do not touch!
High Voltage

Keyboard Ribbon Cable Installation

Important: Pin 1 of the TRS-80 keyboard ribbon cable is located at the TOP of the TRS-80 motherboard. Contrary to industry standard markings, the TRS-80 keyboard cable usually has a red or black mark on the pin 20 edge of the cable. Pin 1 on the NEWKEY/80 adapter is the side closest to the power connector (and is marked as "1").
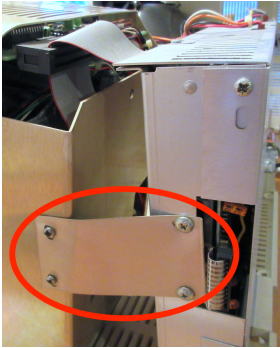
Step 1: Remove the protective ribbon cable bracket.
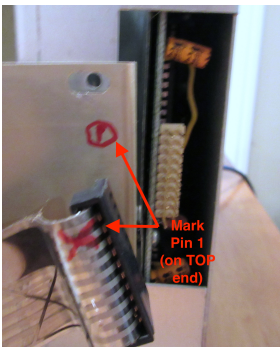
Step 2: Mark the TOP edge of your existing keyboard cable as "Pin 1". Then gently unplug your existing keyboard ribbon cable from the TRS-80 motherboard connector.

Step 3: Gently feed your existing keyboard cable under the drives (if present) and into the empty space in front of the keyboard.

Step 4: Plug the NEWKEY/80 ribbon cable (marked "TRS") into TRS-80 motherboard connector with Pin 1 at the TOP and re-attach the protective metal keyboard cable bracket.
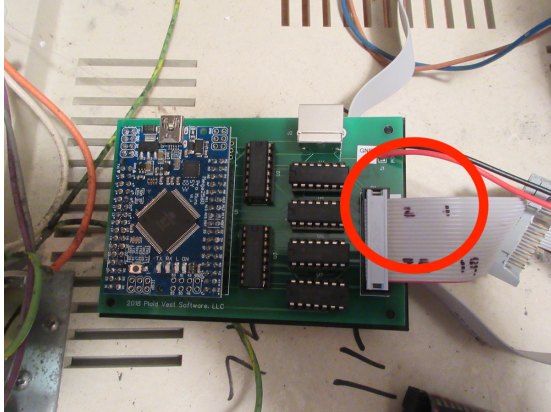
Step 5: Plug the other end of the NEWKEY/80 ribbon cable into the NEWKEY/80 adapter, aligning Pin 1 markings.
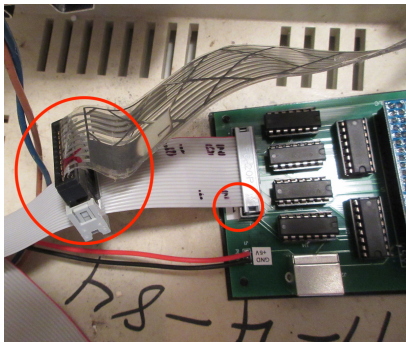
Optional: Using OLD and NEW keyboards at the same time:

Plug your old TRS keyboard ribbon cable (that you unplugged in Step 2) into the NEWKEY/80 ribbon cable box connector (aligning Pin 1).

Power

The NEWKEY/80 keyboard adapter requires a regulated +5v power and a ground connection. This can be provided either by an external +5v adapter (not included) or by using your existing TRS-80 power supply (recommended). The NEWKEY/80 adapter requires very low current so you should be able to tap into existing power wires used by the TRS-80's disk drives, motherboard, or RS232 adapter.

CAUTION: The TRS-80 monitor, related circuit board and power connections contain DANGEROUS VERY HIGH VOLTAGE. Never touch or modify the monitor or related circuit board. Only use the lower voltage connections that supply power to the motherboard, RS232 interface, or disk drives.
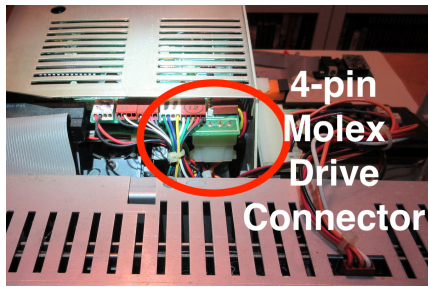
For a Disk-Based TRS-80, the easiest method is to use the included Molex 4-Pin disk drive Y-Splitter cable.

Depending on your TRS-80 this may be accomplished without removing the disk drive. Some TRS-80's require the drive to be partially removed to allow room to remove and replace the 4-Pin power splitter.
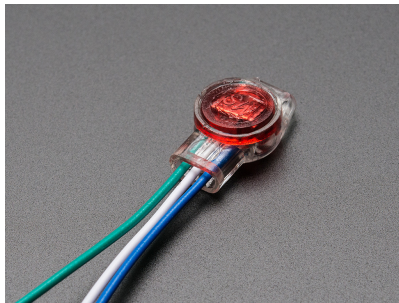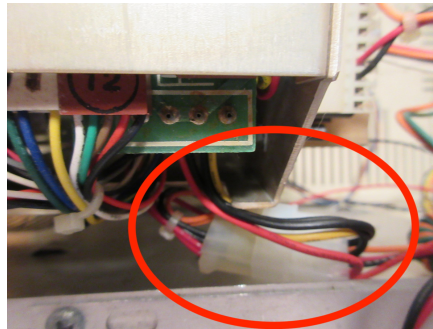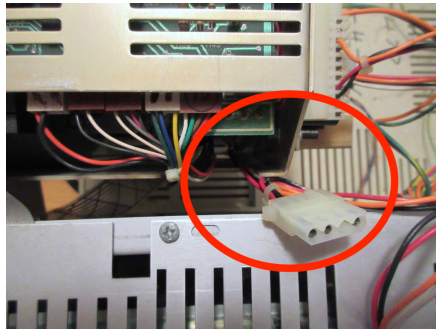
For a diskless TRS-80, you will need to connect to the TRS-80 internal power supply. You may use the included wire crimp connectors or solder the NEWKEY/80 2-wire power cable onto existing +5V (red) and Ground (black) wires.

Power supplies vary between TRS-80 models, so it is difficult to provide specific instructions. You will see markings on the power supply board that shows the output pin layouts. +5v is usually a red wire, and ground is usually ground.
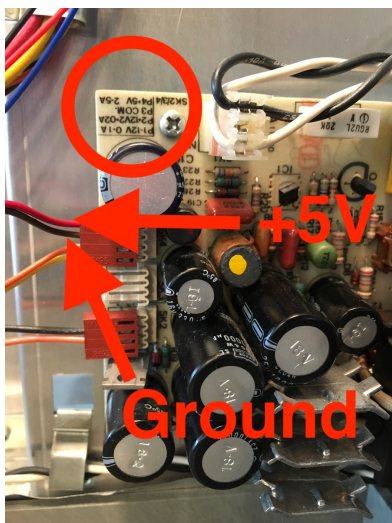
The included wire crimp connectors are easy to use. Just cut an existing +5V (red) power wire (with the TRS-80 TURNED OFF). Then insert the two ends of the wire into the crimp connector along with the related NEWKEY/80 power cable wire (+5 or ground). Crimp the three ends together with a pair of pliers. Try to crimp straight down, not at an angle. Repeat for the ground (black) wire.

Make sure to test the power connections with a multimeter before connecting power to the NEWKEY/80 adapter. Red wire should be +5V and black wire should be ground (-).

Feel free to contact support@plaidvest.com if you need any help identifying an existing +5v and ground wires.

 Final Assembly

1) Plug your keyboard into the NEWKEY/80 adapter board.

Please note that the NEWKEY/80 adapter has two keyboard ports:
- PS/2 (round)
- USB (rectangular)

There is only one port active at a time depending on the Firmware that is currently loaded into the NEWKEY/80 adapter. The pre-loaded active port is marked on a sticker on your NEWKEY/80.

To switch between PS/2 and USB port you will need to download and flash the appropriate firmware to your NEWKEY/80.

You may use inexpensive PS/2 or USB extension cables (not included) if you wish to route the cables outside of the TRS-80.
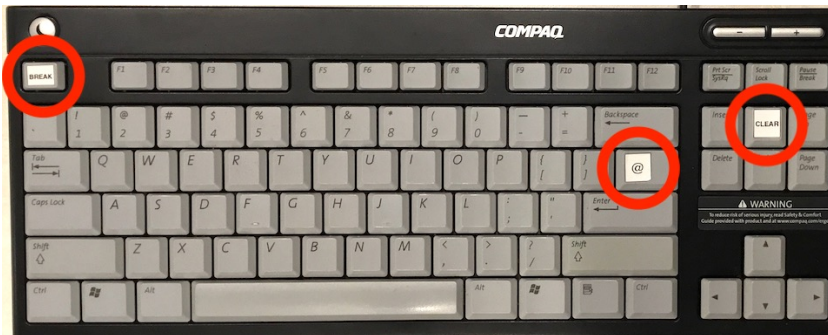
2) Apply the three special key stickers (included) to your keyboard, if desired. See the "Special Keys" section for key definitions.

You may choose to remove your existing keyboard and mount your keyboard in or on top of the TRS-80 keyboard opening.

It is recommended to use double-sided mounting tape to secure the NEWKEY/80 adapter to the bottom of your TRS-80 case.

2) Plug in your Atari joystick (DB-9 connector). Use of a 9-Pin Serial or Atari joystick extension cable is recommended to route your joystick port outside of the TRS-80 case.
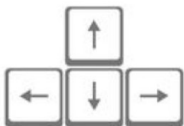
 Special Keys (Use included keyboard stickers if desired)

PS/2 or USB Key　　　**TRS-80 Key**
\ (backslash)　　@
ESC　　　　　　　<Break>
Home　　　　　　<Clear>

Special Key Combinations:
- CTL-ALT-DELETE = Reset TRS-80
- CTL-ALT-R = Reset NEWKEY/80 adapter
- CTL-ALT-A = About NEWKEY/80, shows current version and settings
- CTL-ALT-H = Help Screen, shows keyboard shortcuts
- CTL-ALT-3 = Switch to Model III mode
- CTL-ALT-4 = Switch to Model 4 mode (enables Ctrl, Caps, F1, F2, F3 keys)
- CTL-ALT-KEYPAD-* = Generate and run RetroStoreCard BASIC loader program
(see https://github.com/apuder/RetroStoreCard)

Using NEWKEY/80 For The First Time

When connected correctly, NEWKEY/80 green power LED should be lit. If not, please check your power connections. (+5v = red wire, ground = black wire).

Make sure to set the type of TRS-80 you are using with **CTL-ALT-3** (Model 3) or **CTL-ALT-4** (Model 4). This setting is saved even when the power is turned off.

CTL-ALT-A (about) will show the current firmware version as well as your TRS-80 keyboard type.

CTL-ALT-H (help) will show NEWKEY/80 command shortcut key combinations

CTL-ALT-DELETE will reboot your TRS-80. Holding the <BREAK> key at the same time will force your TRS-80 to boot into BASIC (Cass? prompt).

Firmware Updates

PS/2 and USB Firmware files are available at www.newkey80.com

To update the firmware you will need to upload a new .hex file to the Arduino micro-controller via a mini-USB cable and a Windows PC. You can use a Mac computer to perform this update but the procedure is a little harder. GOOGLE can provide instructions on how to flash an Arduino microcontroller from a Mac. Otherwise, please contact support@plaidvest.com

NOTE: Please unplug the NEWKEY/80 +5V power cable while uploading the firmware.

While you can use an ISP programmer for updating the firmware, using a firmware uploading tool is much easier.   Two possible applications are:

XLoader for Windows PC   http://russemotto.com/xloader/
HexUploader for Mac   http://paulkaplan.me/HexUploader/

The chip type is Mega (ATMEGA2560). Port is usually COM3 on PC but you will need to check (Control Panel >> Device Manager >> Ports) to be sure. On Mac serial port is something like "usbmodem..."

You can verify the current firmware version with the CTL-ALT-A command on your TRS-80.

Contact/Questions/Comments/Bugs

Firmware and Installation & User Guide updates available at www.newkey80.com
Send any questions or comments to support@plaidvest.com or visit www.newkey80.com
Thank you for your feedback!

FAQ (Frequently Asked Questions)

I am having trouble connecting the NEWKEY/80 power wires.
Please contact me directly at support@plaidvest.com. I am sure we can get it working for you.

Why are random characters appearing when I type on my new keyboard?
1) Double-check your cable connections. There is a very good chance you have one of the connectors on backwards. Please note the location of pin #1 on each connection.

2) Verify power to NEWKEY/80 is +5V (using Multimeter). Some external supply markings may not be accurate.

Why is <CAPS LOCK> key not working, or why am I seeing a "0" when I press <CAPS LOCK>?
You are probably not using the correct machine setting. Set the type of TRS-80 you are using with CTL-ALT-3 (Model III) or CTL-ALT-4 (Model 4).

NEWKEY/80 green power LED is not on:
Check power connections. Red wire needs +5v. Black wire is ground.

NEWKEY/80 is not working. The NEWKEY/80 green power LED is on but the keyboard CapsLock and NumLock lights are not on and do not toggle the keyboard status LED's:
Your keyboard may not be compatible (this is very rare). The keyboard status lights (CapsLock and NumLock) should come on immediately after powering up the TRS-80. Try another keyboard, if possible.

NEWKEY/80 not working. Green power light is on. Keyboard CapsLock and NumLock lights are on and toggling OK.
Try pressing CTRL-ALT-3 (hold down Ctrl key and Alt key and 3 key). If you see a "K5" on the TRS-80 screen and your TRS-80 reboots that means your keyboard cable is plugged in backwards.

Can I use my new keyboard at the same time as my original TRS-80 keyboard?
Yes!

Why does the NEWKEY/80 power light go off when I try to update the firmware?
Please disconnect the NEWKEY/80 +5v power connector before attempting to update the firmware with a micro USB cable.

Why does my USB keyboard lock up after running NEWKEY/80 special commands (ie. CTL-ALT-A).
Please update with latest (1.4+) firmware. This was a problem with some USB keyboards.